The Snyder Canal Slip: Its Development in Relationship to the Delaware & Hudson Canal and its Connections to the Natural Cement Industry.

Staff from the New York Museum conducted archaeological monitoring and data recovery in the southern portion of the Snyder Estate Natural Cement Historic District during the spring, summer and fall of 2011. The former Snyder Cement Works and Lawrenceville Cement Company were located along a small stretch of the D&H Canal that traveled through the hamlet of Lawrenceville (Figures 1 and 2). The Lawrenceville plant was known by several names throughout its long period of operation. these include the Lawrenceville Among Manufacturing Company (1858), Lawrenceville Hydraulic Cement Works (1887), Lawrenceville Cement Co (1892), W. T. Van Tassel Cement Co., and finally the Consolidated Rosendale Cement Co.

The history of the Snyder Cement Works took a different course. Ownership of the company remained in the Snyder family for generations. During the mid to late nineteenth century the A.J. Snyder & Sons Company developed mines, built kilns and a cement mill and for a brief period in the late 1920s the company included corporate partnerships, and then privately owned (1935-1970) as the Century Cement Company, a name used since 1924.



Figure 1. The 1904 Sanborn Insurance Map depicting the A. J. Snyder & Sons Cement Works and the Lawrence Cement Works under the ownership of W. T. Van Tassell Co. At this time the Snyder mill, kilns and storage building clustered in an area just north of the canal slip. An extensive storage building covered the northern end of the slip. The Lawrenceville Cement Co. ceased operation by 1904 and soon fell into ruins.



View of the outlet of the Snyder Canal Slip where it emptied into the canal.

Excavation exposing the top of the culvert as it rested in receiving basin portion of the slip.

The Delaware and Hudson Canal was designed primarily as a waterway to transport coal from mines in Pennsylvania to Kingston. It was first described in the Albany Argus in 1829 as a ditch that measured 32 to 36 feet wide at the water line and having a depth of four feet. The 108 locks were 70 feet long, 9 to 10 feet wide and 8 to12 feet high. Approximately 10,000 immigrant workers, using only hand tools and draft animals, constructed the canal in less than three years (1825-1828). The first boats to travel on the canal were long and narrow of the Durham type and were estimated to carry 25 to 30 tons of coal. Around 1833 regular improvements were conducted on the canal, which included widening, lock enlargement, and deepening of the canal. When work was completed in 1851, the prism measured 48 to 50 feet on top, 32 feet on the bottom, and 6 feet deep in order to accommodate larger barges that could hold 136 tons (Lowenthal 1997).

Prior to opening of the canal in 1829, natural cement beds were discovered during the excavation of the canal prism. Almost immediately several natural cement companies became operational. The D&H Canal had a significant role in the development of cement companies from High Falls east to Eddyville. The most significant impetus for the growth of the Rosendale Cement industry was the canal, which provided cheap and convenient transportation for most of the cement produced in the area. It was shipped to market eastward to the Hudson River on the canal and then towed to terminal facilities in New York City. The demand for American made natural cement continued throughout the nineteenth century and was used both in domestic and industrial projects as well as large governmental projects that required watertight locks, dams, retaining walls, piers, aqueducts and bridges.



View west of the active removal of fill from the D& H canal



View of the canal after restoration, having a depth of nearly 6 feet.

Before the canal was constructed, most of the early settlers in the area built their homes and cleared fields in the fertile valleys surrounding the Rondout River. The development of cement industry continued at a slow pace since the time of its early production at High Falls and Lawrenceville. By the mid nineteenth century numerous cement works were operational in the eastern part of the county, in an area of about 30 square miles along the route of the canal as it traveled through the Rondout Creek valley, an area that became known as the Rosendale district. Cement was not the only natural resource exploited; many industrial enterprises were based on the natural resources found in the forests that the canal pasted through. Wood became vital to the production of the barrels that were used to store and ship the cement made in the area. Cooperage shops were commonly set up along side cement plants to expedite the packaging of the day's production. This created a great demand for wooden barrels and resulted in the growth of the cooperage industry. Cooperages used large quantities of properly seasoned wood that came from the lumber industry along the Delaware River. During these critical years the canal boats carried more wood than coal, coal being the main reason why the canal was originally constructed (Genero 2005).

In 1755 Jacob Low Snyder originally owned the land on which a number of cement companies developed. By 1800, this early pioneer and farmer had accumulated several large tracts of land along the Rondout Creek between High Falls to Rosendale. The property was developed for agricultural use at first. The Snyder family built a gristmill on the north bank of the Rondout Creek around 1809 to exploit this activity (La Frank 1992). Agricultural communities developed around the location of gristmills because they served an essential service by providing custom milling of wheat harvests. The miller was often paid a portion of the flour, the remainder going to market.



Figure 2. 1875 Beers Atlas depicting the cement works of A. J. Snyder, Rosendale Cement Co., and Lawrenceville Cement Co.

During the initial phases of planning, the route of the canal traveled through the southern end of the Snyder property, thus cutting off access to the Snyder gristmill and their land along the Rondout Creek. Prior to construction (c. 1827), a deal was made between the chief engineer of the D & H Canal (John B. Jervis) and Jacob Snyder, that included a right of way through the Snyder property, and the construction of a boat slip and bridge by the D&H Company (collections of the Century House Historical Society/ La Frank 1992). The canal bridge provided access to the gristmill and lands along the south side of the canal, and the slip was a convenient way to transport flour to market.

Even though a profitable relationship existed between the production of flour and the new transportation system, the seeds of change were sown during canal construction when a clay rich limestone was discovered beneath the Snyder property. Natural hydraulic cement could be made from this particular local limestone, a dolostone associated with the Rosendale and Whiteport members of the Rondout Formation (Werner and Burmeister 2007).



Photo of the Lawrenceville Cement Company taken c. 1890. The bridge over the canal is shown in the foreground. (Courtesy of the D&H Museum)

In the period following canal construction, Lawrenceville became an industrious community. Besides the cement works, the small hamlet contained tenements for the workers, and commercial enterprises such as stores and taverns. The community was named for Watson E. Lawrence, the man credited for the start of the cement industry in this region. In the fall of 1827 Lucas Elmendolf and Watson E. Lawrence began manufacturing under the Rosendale Cement Brand. The original cement works were located approximately 900 ft east of the Snyder canal slip, consisting of a converted gristmill and two "pot kiln", each kiln capable of producing 25 barrels per week (Gilchrist 1976). The Rosendale Manufacturing Company was incorporated at this time as the Lawrence Cement Works. Lawrence experimented with different forms of kilns that lead to the more efficient continuous draw kiln. Despite advances in the technology employed to produce cement, Lawrence's cement works failed within a few years of operation. Lawrence moved his works to a site he leased from Snyder in the southeast corner of the historic district.



View of the early draw kilns and predecessors associated with the first cement works in Lawrenceville known as the Rosendale Cement Company (c.1827-1837).

This agreement stipulated that the Lawrenceville Cement Works could dig, quarry and burn cement on Snyder's land in exchange for payment based on production. Lawrence built new kilns and converted the Old Snyder Gristmill so it could be used to grind the calcined limestone (La Frank 1992).



The Lawrence Kilns, originally constructed around 1837 when Lawrence started his second works, the Lawrenceville Cement Works. This battery is located adjacent to canal slip on the lands of Andrew J. Snyder (Sylvester 1880).

The early cement works inspired many others in the town to start works during the time leading up to 1837. After Jacob L. Snyder died in 1834, his daughter Catherine and husband Andrew J. Snyder I consolidated the divided Snyder Estate and made inroads towards cement production. Andrew J. Snyder served as a superintendent of a quarry located on the farm of Silas Snyder between the years 1848 and 1853 and worked the mines adjacent to the quarries of the Lawrenceville Cement Company for three years (1850-1853). When Lawrenceville Manufacturing Company failed in 1861, William Beach and John Spaulding took over and renamed the works the Lawrenceville Cement Company. Around this time a new cement mill was built on the south side of the canal, directly across from the canal slip (now a parking lot adjacent to the former electric substation). After returning briefly to farming, Snyder continued to mine the eastern section of the Widow Jane Mine and the western portion of the Lawrenceville Mine (c.1858). Lawrence initially developed these mines when leasing lands from J. L. Snyder in the 1830s. Historic source indicate Snyder built kilns and sold the calcined cement rock to the newly organized Lawrenceville Cement Company under William N. Beach, and shipped a portion to mills in Brooklyn and New Jersey where it was refined into cement (Sylvester 1880; La Frank 1992).



coopers at Lawrenceville Lawrenceville cement workers gathering together for a photo post 1880. The cooperage shop and office depicted left and center. The canal bridge is shown center right. Courtesy of D&H Museum



The Lawrenceville works after it ceased operation in 1902 (c.1904). The bridge over of the slip and foundation remains of the tenement building shown in the foreground. Courtesy of Ellenville Public Library (Wakefield 1992).

Under the A. J. Snyder and Sons Cement Company, the cement works experienced significant growth from the 1860s to the 1880s. Storage buildings were built in the vicinity of the canal to receive coal and other supplies and aid in the transfer of cement in the 1870s, and a new cement mill was built just north of the canal slip in 1887. A fleet of canal boats was also purchased to control the distribution of the company's cement. Additional vessels designed to travel on the Hudson River were added after 1891 at the time they acquired dock rights in Wilbur. After A. J. Snyder had passed away in 1902, the Snyder family continued to produce natural cement despite the crash in demand. A. J. Snyder II was able to navigate the tumultuous ups and downs of the cement market and led the company from 1911 until 1970 when the works closed (La Frank 1992).



Cement boat docked across from the Lawrenceville cement works (c. 1880-1890). Courtesy of the D&H Museum



View northwest of slip entrance along north side of the canal.

Due to the irregular terrain, repeated attempts were made to stabilize the roadbed of NY 213. In 2010 a slope failure occurred that undermined the highway. The canal was filled in to facilitate the road reconstruction that followed. Archaeological monitoring focused on two archaeological features, the National Register listed Snyder Canal Slip, and the portion of the National Register eligible Delaware Hudson Canal. Both of these are located in the Snyder Estate Natural Cement Historic District, a property listed on the National Register of Historic Places. The segment of the D &H Canal includes the basin where the canal slip emptied into the canal and a section that extends from the former highway bridge that crossed over the slip east through Lawrenceville to Lock 9. During archaeological monitoring, fill materials were removed and the canal was brought back to its former condition using original materials with some improvements. The 1920s culvert that was placed in the Snyder Canal Slip when the canal was abandoned was replaced with a larger pre-cast culvert.



Monitoring of excavations in the canal. Intact portions of the berm wall are shown at right and sloped towpath at left.



The removal of the roadbed revealed the top of the 1920s poured concrete culvert.



Completed excavation of the canal prism, west to the former canal bridge crossing.



Final depth of excavation inside of the slip measured 11 ft (3.3 m) below top of the west wall of the slip.

A cement storage building was built over the northern portion of the slip sometime during the period following significant growth of the Snyder Cement Works in the 1860s. The building was expanded and improved during the late nineteenth century and removed by 1924 (Sanborn Insurance Maps 1887, 1892, 1898, 1904 and 1924). Together the canal slip and storage building provided an efficient way to transfer goods from barges into storage and siding areas. Canal boats entered the slip filled with coal from Pennsylvania and wood staves harvested from the forestlands along the canal corridor. Empty barges were filled with cement and shipped eastward to Eddyville. From this point the cement boats were often towed down the Hudson River to markets in New York City and New Jersey. The sizes of the cement boats varied, often owned by private companies. The size of the coal boats was often dictated by the D&H Coal Company, some of them reaching 90 feet long, 14 feet wide, and a carrying capacity of 125 to 145 tons, dimensions used after the canal enlargement in the early 1850s. The A. J. Snyder Cement Company operated 2 boats to New York and other points. The Minnie S., named for Mrs. Snyder, carried 1000 barrels of cement, 750 in the hull and 250 on deck. The cement traveled on the canal to the Hudson River where it was towed south to the Harlem River by the New York Cornell Steamboat Company (Wakefield 1992).



A boat is pictured in the slip at the southern entrance of the storage building (c.1900), possibly carrying a bulk shipment of coal. Note the stones lining the slip walls (Leroy 1950).



Figure 3. The 1916-1921 "as-built" construction plans depicting the construction of the culvert beneath the highway. The original plans were altered in 1920 in favor of removing the bridge; placing a culvert into the slip and filling it over (see profile in red circle).

The canal slip was positioned in close proximity to an activity area once occupied by storage buildings, a wooden stave storage building, a tenement, coal storage, and the first of several tramway piers carrying fired limestone from the Lawrenceville kilns (Figure 4). A tight clustering of buildings and storage piles close to the slip facilitated the unloading of wooden staves, coal and the shipping of cement. A storage facility was constructed over the slip as early as the 1870s to provide coverage against the elements and house loading apparatus. The 1875 litho-graph shown below depicts the slip storage building and a residential 1½ story building, positioned on the west side of the slip identified as the Snyder Tenant House. The tenement was built into the slope rising west to a driveway that leads to the Snyder cement works. By 1892 the tenement was used for the storage of staves and may have functioned as a cooperage shop. The building was removed prior to 1898. The canal slip was filled in 1921, a highway culvert placed into the slip, and a roadbed built in place of the former bridge. This highway work occurred several years after the canal was abandoned and the slip was no longer used. Approximately 90 years later the culvert was replaced with a significantly larger structure designed to be capable of handling a 100 year flood event, evidently needed in August 2011 during the historic flooding of Hurricane Irene.

Other structures including a tenement and storage building associated with the Lawrence Cement Works, were located on the east side of the slip (Figure 4). A coal storage pile and tramway with masonry support pillars ran long the west side of the storage building in a relatively level and accessible area where supplies were unloaded by derricks set along the sides of the slip.



Figure 4. Lithograph c.1879 from *History of Ulster County* depicting the Lawrenceville cement works (looking south from the Lawrence Kilns). The mill is located on the south side of the canal and kilns used in association with the company in foreground. The Snyder works are positioned on the north side of the highway. The slip is circled in yellow, storage building in blue and Snyder Tenant House in red (From Wakefield 1992).

In addition to investigation of historic documentation such as period maps, photos, etc., an archaeological study of the slip provided information about the several different phases of construction through the mid to late nineteenth century. Measurements were taken of the slip's width, length and height and also noted were the locations of seams, the types and sizes of the stones used, identification of areas where cement was present, the building techniques employed and the presence of unique features such as metal hardware. The slip consists of three sections, a receiving basin and entrance at the southern end, the loading slip or midsection north of the culvert, and a stone lined water channel at its northern end. Each section served a different function. Archaeological monitoring during this project occurred primarily in the area where the culvert was removed, extending from the receiving basin to the loading slip. The receiving basin and entrance section was a navigable channel, designed with flaring wing walls at is southern end. These walls were intergraded with the berm walls of the canal and were designed with a bell shape at its entrance that facilitated the movement of barges into and out of the canal. This was a considerable task given the 90 degree turn into the slip for barges that were between 70 to 90 feet in length. The receiving basin measured approximately 82 feet long and varied in width along its length; 50 feet at its entrance with the canal, 30 feet at its midsection, down to 23 feet at it northern end adjacent to the first of two seams along the east wall (see photo below). The receiving basin continued to taper down to a second seam where it transitions into the loading slip. The loading slip measured 77 feet long by 14.8 feet wide, leaving little room for the barges. After coal barges were unloaded or filled with cement they then traveled back out of the slip beneath the former highway bridge into the canal.





View north of the slip, showing the wide receiving basin and loading slip constructed of high parallel walls with uniform construction.



View south of the loading slip. Most of the walls remained intact with masonry elements of the loading and storage building, along its full length.

Study of the eastern wall of the slip in the receiving basin revealed at least two seams (see arrows), a variable construction technique and the use of different stones.

The bulk of the stone used in the construction of the slip consisted of rough-cut hewn stones of significant size. It was apparent that natural cement was used in many of the seams between the stones, particularly in the western wall and the lower wall courses of the eastern wall. The cement likely originated from the works of A. J. Snyder located adjacent to the site. The eastern wall of the slip near the transition between the receiving basin and the loading slip proved to be one of the most interesting features, showing evidence of different construction methods and materials (see photo above). A wooden beam was located at the base of the wall set into the grey clay that lined the base of the slip. The east wall was likely modified over time to accommodate to the barges used by the company. Additional wooden elements were observed in the west slip wall and along the receiving basin at its mid section. Wood planking was located just above the level of the bottom course of stone (see photos below).



West wall of slip showing location of wood planking located 3 feet above base of excavation.



The full height of west wall of slip (11 feet) shown in foreground. Base of slip marked with yellow dashed line.

The top of the slip walls is located approximately 6.5 to 8.2 feet below the surface of the highway. After stream sediments were removed it was found that the eastern wall of the slip stood approximately 10 feet in height, the western wall measured slightly higher at 11 feet. Several feet of the wall lie below the clay at the base of the slip. The height of the slip walls was built to maintain a minimum of 6 to 7 feet of water in the slip channel, water supplied by both the Tan House Brook and the canal. The slip walls were higher inside of the storage building; having a total height of approximately 15 feet, measuring from 8 to 10 feet above the steam bed. Several of the stones in the upper course(s) were missing changing the height of slip walls since the time of its operation. The walls of the tenement rose 10.5 feet above the level area between the slip and the tenement. These walls were also constructed of roughly hewn and rumble stones with a natural cement binder, though they varied considerably from the slip wall construction, suggesting a different building period and or function.



A unique construction technique was observed along east wall of slip. When excavated fully it measured 10 feet in height with the large roughly hewn stones used in the wall's lower four courses. The upper courses varied considerably, made of stone approximately 1/3 the size used in most of the slip. A wooden beam was located at the base of the wall in the clay layer.



A wooden plank and post was located approximately 16 feet below the roadbed. The plank was 1 feet wide by 2 inch thick and traveled the base of the slip, approximately 5 feet from the slip's east wall. The plank is possibly the last remaining elements that formed the base of the slip in the receiving basin. The placement of the culvert in the 1920s had removed most of the material in this location.



The western bridge abutment, made of rough hewn stones and cement, was located approximately 2.6 feet below the surface of the road.

![](_page_8_Picture_2.jpeg)

The south end of the bridge abutment was constructed of curved hewn stones that meshed into the wing walls at the entrance of the slip. An early water main ran along the southern edge of the abutment wall.

A bridge has carried the highway (NY 213) over the slip since the late 1820s, crossing just inside of the wing walls of the entranceway in the receiving basin. The abutments held the deck of the bridge above the canal, the western abutment located just below the highway bed. This masonry structure was part of a continuous structure that linked the wing walls of the slip opening to the canal berm wall that lined the north side of the canal. The bridge abutment was approximately 18 feet wide, and crossed the width of the slip 28 feet. When the culvert was constructed (c.1920), the bridge was removed and the slip was filled leaving the abutments and slip walls in place (Figure 3).

![](_page_8_Picture_5.jpeg)

![](_page_8_Picture_6.jpeg)

Elements of the 1920s highway culvert, consisting of cement (likely Portland), steel I beams and wooden arch supports.

Tie-off cleat found in the slip receiving basin during recent construction activities and recent flooding (scale: tenths of feet).

![](_page_8_Picture_9.jpeg)

Close-up of wooden arch supports used at the time the cement was poured, forming a series of arches along the entire length of the culvert (scale: tenths of feet).

![](_page_8_Picture_11.jpeg)

A diverse collection of artifacts was recovered from the canal slip and along the berm of the canal adjacent to the workers housing. Pictured are items associated with the daily lives of the cement workers and boatmen; bottle glass, ceramic fragments, shell, bone, and a few personal objects such as tobacco pipes. Some objects had connection to the cement industry, such as the test cement briquettes.

# **Reference Materials Included**

Beers, F.W.

1875 County Atlas of Ulster, New York. Walker & Jewett: New York.

#### Century House Historical Society

2011 History (Rosendale natural cement region). Century House Historical Society, Rosendale, New York. Contact: Gayle Grunwald

# Delaware and Hudson Canal Museum

2011 History and Photos (D & H Canal from High Falls to Rosendale) Delaware and Hudson Canal Historical Society and Museum, High Falls, New York. Contact: John C. Motzer

#### New York State Department of Highways

1916/1920 Plans for Improving the Rosendale Village Highway (SH 1419). NYS DOT, Albany, New York.

### Sanborn Map Company

1904 Fire Insurance Map of Rosendale, New York, Sanborn Map Company, New York

## **References Cited**

# French F.F.

1858 Map of Ulster County, New York. Tainter & Dawson: Philadephia.

# Genero, Peter P.

2005 Thank Rosendale: New York-Empire State. Genero Publishing: Fort Pierce, Fl.

### Gilchrist, Ann

1976 Footsteps Across cement: A History of the Township of Rosendale, N.Y.

## LaFrank, Kathleen

1992 *Snyder Estate Natural Cement Historic District Registration Form.* New York State Office of Parks, Recreation and Historic Preservation, Albany, N.Y.

# Le Roy, Edwin D.

1950 The Delaware and Hudson Canal, a history. Wayne County Historical Society, Honesdale, Pa.

#### Lowenthal, Larry

1997 *From the Coalfields of the Hudson; A History of the Delaware and Hudson Canal.* Purple Mountain Press, Fleischmanns, N.Y.

## Sanborn Map Company

- 1887 Fire Insurance Map of Rosendale, New York, Sanborn Map Company, New York
- 1892 Fire Insurance Map of Rosendale, New York, Sanborn Map Company, New York
- 1924 Fire Insurance Map of Rosendale, New York, Sanborn Map Company, New York

# Sylvester, Nathaniel

1880 History of Ulster County, New York. Everts and Peck: Philadelphia.

### Wakefield, Manville B.

1992 Coal Boats to Tidewater. Purple Mountain Press, Fleischmanns, N.Y.

# Werner, Dietrich and Burmeister, K.

2007 An Overview of the History and Economic Geology of the Natural Cement Industry at Rosendale, Ulster County, New York. Journal of ASTM International, Vol 4, No. 6. ASTM Internatial West Conshohocken PA.